Claims

1. (Amended) A semiconductor device comprising:

a plurality of transmission lines, formed in a semiconductor chip, each formed of a ground wiring to have the ground potential and a power supply wiring to carry a power supply current with an insulating film interposed between the ground wiring and the power supply wiring; and

a transmission line element formed in a semiconductor chip and arranged to relay said power supply current carried between said transmission lines, said transmission line element being formed of said ground wiring and said power supply wiring with an insulating film interposed between the ground wiring and the power supply wiring and having a characteristic impedance sufficiently low as compared to the characteristic impedance of said transmission line.

2. (Amended) The semiconductor device according to claim 1, wherein said transmission line element has a large capacitance per unit length such that the characteristic impedance thereof is low enough as compared to the characteristic impedance of said transmission line.

3. (Amended) The semiconductor device according to claim 1, wherein the effective length of said transmission line element is a transmission line length longer than one fourth of a wavelength corresponding to the lowest frequency in the frequency range intended for decoupling.

4. (Canceled)

5. The semiconductor device according to claim 1, wherein said transmission line element has said ground wiring and said power supply wiring formed in a corrugated form with a separation thereof kept at a constant distance.

6. The semiconductor device according to claim 5, wherein said transmission line element has at least either depressions or protrusions on said ground wiring, said insulating film and said power supply wiring.

7. The semiconductor device according to claim 5, wherein said transmission line element is formed in a corrugated form with corrugations arranged in a direction perpendicular to said signal transmission direction.

8. The semiconductor device according to claim 5, wherein said transmission line element is formed in a corrugated form with corrugations arranged in said signal transmission direction.

9. The semiconductor device according to claim 5, wherein said transmission line element is formed in a corrugated form with corrugations arranged both in a signal transmission direction and in a direction perpendicular to said signal transmission direction.

10. The semiconductor device according to claim 5, wherein

the surfaces formed in a corrugated form of said ground wiring, said insulating film, and said power supply wiring of said transmission line element are each further formed in a form having a plurality of ridges

11. (Canceled)

12. (Amended) The semiconductor device according to claim 1, further comprising:

a plurality of transmission lines implemented on power supply leads each for supplying a power supply current from an external circuit, each formed of a ground wiring to have the ground potential and a power supply wiring to carry a power supply current with an insulating film interposed between the ground wiring and the power supply wiring; and

a transmission line element implemented on power supply leads and arranged to relay said power supply current carried between said transmission lines, said transmission line element being formed of said ground wiring and said power supply wiring with a second insulating film interposed between the ground wiring and the power supply wiring, and further said transmission line element having a characteristic impedance sufficiently low as compared to the characteristic impedance of said transmission line.

13. (Amended) The semiconductor device according to claim 12, further provided with a resin layer formed on a ground potential surface interposing said transmission line element, with the ends of said power

supply leads being connected to said transmission line element and said power supply leads being formed on said resin layer, wherein

said transmission line element is formed thinner than said resin layer.

14. (Amended) The semiconductor device according to claim 12, further comprising:

a transmission line element formed on a part of an insulating substrate of a package, and

an insulator layer mounted on said transmission line element and provided with a through-hole that passes from the top to the bottom of the insulator layer, wherein said power supply leads are formed on said top and connected to said power supply wiring of said transmission line element through said through-hole.

15. (Amended) A semiconductor circuit, provided with:

a semiconductor device according to claim 12, and

a printed-circuit board on which said semiconductor device is mounted, provided with a plurality of transmission lines each formed of a ground wiring to have the ground potential and a power supply wiring to carry a power supply current with an insulating film interposed between the ground wiring and the power supply wiring, and a transmission line element arranged to relay said power supply current carried between said transmission lines, said transmission line element being formed of said ground wiring and said power supply wiring with a second insulating film interposed between the ground wiring and the

power supply wiring and having a characteristic impedance sufficiently low as compared to the characteristic impedance of said transmission line.

16. (Amended) The semiconductor circuit according to claim 15, wherein said transmission line element has a characteristic impedance to yield a variation in a direct-current power supply voltage applied to said power supply wiring to be 5 % or less.

17. (Amended) The semiconductor circuit according to claim 15, wherein the transmission line element mounted on a semiconductor chip of said semiconductor device has capacitive characteristics for the highest frequency of the high frequencies generated in said semiconductor chip,

the transmission line element mounted on the power supply lead of said semiconductor device has capacitive characteristics for the frequency range lower than the frequency range for the transmission line element mounted on a semiconductor chip, and

the transmission line element mounted on the printed-circuit board has capacitive characteristics for the frequency range lower than the frequency range for the transmission line element mounted on the power supply lead of said semiconductor device.

18. (Amended) A method of fabricating a semiconductor device having a plurality of transmission lines each formed of a ground wiring to have the ground potential and a power supply wiring to carry a power

supply current with an insulating film interposed between the ground wiring and the power supply wiring, including

an element-forming step of forming a transmission line element arranged to relay said power supply current carried between said transmission lines, said transmission line element being formed in a semiconductor chip and formed of said ground wiring and said power supply wiring with a second insulating film interposed between the ground wiring and the power supply wiring, and said transmission line element having a characteristic impedance sufficiently low as compared to the characteristic impedance of said transmission line.

19. (Amended) The method of fabricating a semiconductor device according to claim 18, wherein said element-forming step comprising the steps of:

forming said ground wiring;

patterning said ground wiring and forming the ground wiring in a corrugated form;

forming said insulating film on said ground wiring; and

forming said power supply wiring on said insulating film.

20. (Amended) The method of fabricating a semiconductor device according to claim 18, wherein said element-forming step comprising the steps of:

forming said ground wiring;

patterning said ground wiring and forming corrugations arranged in a signal transmission direction and also in the direction

perpendicular to said signal transmission direction on the ground wiring;

forming said insulating film on said ground wiring; and

forming said power supply wiring on said insulating film.

21. (Amended) The method of fabricating a semiconductor device according to claim 18, wherein said element-forming step comprising the steps of:

forming said ground wiring;

patterning said ground wiring and forming the ground wiring in a corrugated form;

further forming depressions on the corrugated surface;

forming said insulating film on said ground wiring; and

forming said power supply wiring on said insulating film.

22. (Amended) The method of fabricating a semiconductor device according to claim 18, wherein said element-forming step comprising the steps of:

forming said ground wiring;

patterning said ground wiring and forming the ground wiring in a corrugated form;

further forming ridges on the corrugated surface;

forming said insulating film on said ground wiring; and

forming said power supply wiring on said insulating film.

23. (Amended) The method of fabricating a semiconductor device according to claim 18, wherein said element-forming step

comprising the steps of:

forming said ground wiring;

patterning said ground wiring and forming the ground wiring such that the ground wiring is formed in a corrugated form and further ridges are formed on the corrugated surface;

forming said insulating film on said ground wiring; and

forming said power supply wiring on said insulating film.

24. (Amended) The method of fabricating a semiconductor device according to claim 18, further comprising steps of:

forming resin layers dividedly on a part of a ground potential surface in a package of a semiconductor device;

forming resin layers in a divided configuration on said ground potential surface;

forming power supply leads for supplying a power supply current from an external circuit on each of said resin layers; and

forming a transmission line element having a power supply wiring arranged on said ground potential surface interposing an insulating film, in the position to relay said power supply leads on the divided resin layers, wherein said transmission line element has a characteristic impedance low enough compared to the characteristic impedance of said transmission line.

25. (Added) The method of fabricating a semiconductor device according to claim 18, further comprising steps of:

forming a ground potential surface on a part of an

insulating substrate in a package of a semiconductor device;

forming a ground potential surface on said insulating substrate;

forming a transmission line element having a power supply wiring arranged on said ground potential surface interposing an insulating film;

forming a through-hole in an insulating layer provided in a piece separate from said insulating substrate;

forming power supply leads for supplying a power supply current supplied to the top of said insulating layer and carried from the top of said insulating layer to the bottom of said through-hole through the internal wall of said through-hole; and

affixing said insulating layer to said insulating substrate, and connecting said power supply leads in the bottom of the through-hole and the power supply wiring formed on said transmission line element, respectively.